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THE BIRTH AND GROWTH OF MYTH.

VII.

BY EDWARD CLODD.

"REVENONS à nos moutons," as the impatient client who had lost some sheep reminded his rambling advocate.

In the great body of nature-myth, the stars are prominent members. In their multitude; their sublime repose in upper calms above the turmoil of the elements; their varying brilliancy, "one star differing from another star in glory"; their tremulous light; their scattered positions, which lend themselves to every vagary of the constellation-maker; their slow procession, varied only by sweeping comet and meteor, or falling showers of shooting stars; they lead the imagination into gentler ways than do the vaster bodies of the most ancient heavens. Nor, although we may compute their number, weigh their volume, in a few instances reckon their distance, and, capturing the light that has come beating through space for unnumbered years, make it reveal the secret of their structure, is the imagination less moved by the clear heavens at night, or the feeling of awe and reverence blunted before that "mighty sum of things for ever speaking."

In barbaric myth the stars are spoken of as the children of the sun and moon, but more often as men who have lived on the earth, translated without seeing death. The single stars are individual chiefs or heroes; the constellations are groups of men or animals. To the natives of Australia the brilliant Jupiter is a chief among the others, and the stars in Orion's belt and scabbard are young men dancing a corroboree, the Pleiades being girls playing to them. The Kasirs of Bengal say that the stars are men who climbed to the top of a tree, and were left in the branches by the trunk being cut away. To the Eskimos the stars in Orion are seal-hunters who have missed their way home; and in German folk-lore they are spoken of as the mowers, because, as Grimm says, "they stand in a row, like mowers in a meadow." In North American myth two of the bright stars are twins who have left a home where they were harshly treated, and leapt into the sky, whither their parents followed them, and ceaselessly chase them. In Greek myth the faintest star of the seven Pleiades is Merope, whose light was dimmed because she alone among her sisters married a mortal. In German star-lore, the small star just above the middle one in the shaft of Charles's Wain, is a waggoner who, having given our Saviour a lift, was offered the kingdom of heaven for his reward, but who said he would sooner be driving from east to west to all eternity, and whose desire was granted—a curious contrast to the legend of the Wandering Jew, cursed to move unresting over the earth till the day of judgment, because he refused to let Jesus, weary with the weight of the cross, rest for a moment on his doorstep. The Housatonic Indians say that the stars in Charles's Wain are men hunting a bear, and that the chase lasts from spring to autumn, when the bear is wounded, and its dripping blood turns the leaves of the trees red. With this may be cited the myth that the red clouds at morn and eve are the blood of the slain in battle. In the Northern Lights, the Greenlanders see the spirits of the departed dancing, the brighter the flashes of the Aurora the greater the merriment; whilst the Dacotahs say of the meteors that they are spirits flying through the air.

Of the Milky Way—so called because Hêrê, indignant at the bantling Heraklês being put to her breast, spilt her milk along the sky (the solar mythologers say that the "red cow of evening passes during the night across the sky, scattering her milk"); the Ottawas say that it was caused by a turtle swimming along the bottom of the sky, and stirring up the mud. According to the Patagonians, it is the track along which the departed tribesmen hunt ostriches; in African myth it is some wood-ashes long ago thrown up into the sky by a girl, that her people might be able to see their way home at night; in Eastern myth, it is chaff dropped by a thief in his hurried flight.

But the idea of a land beyond the sky—be it the happy hunting ground of the Indian, or the Paradise of Islam, or the new Jerusalem of the Apocalypse—would not fail to be imagined, and in both the Milky Way and the Rainbow barbaric fancy sees the ladders and bridges whereby the departed pass from earth to heaven. So we find in the lower and higher culture alike the beautiful conceptions of the *chemin des ames*, the Red man's road of the dead to their home in the sun; the ancient Roman path of, or to, the gods; the road of the birds, in Lithuanian myth, because the winged spirits flit thither to the free and happy land. In prosaic contrast to all this, it is curious to find among ourselves the Milky Way described as Watling Street! That famous road, which ran from Richborough through Canterbury and London to Chester, now gives its name to a narrow, bustling street of Manchester warehousemen in the City. But who the Wætlingas were, and why their name was transferred from Britain to the sky,* we do not know, although the fact is plainly enough set down in old writers, foremost among whom is Chaucer. In his "House of Fame"† he says:—

> "Lo, there, quod he, cast up thine eye,
> se yonder, to, the galaxie,
> the whiche men clepe the Milky Way,
> for it is white, and some parfay
> ycallin it han Watlingestrete."

To the savage, the rainbow is a living monster, a serpent seeking whom it may devour, coming to earth to slake its unquenchable thirst, and preying on the unwary. But in more poetic myth, its mighty mani-coloured arch touching,

* Perhaps the converse is true; if the name was a totem which the family adopted, and which was given, as tribute to an important clan, to one of the main roads of this island.

† II., 427.

as it seems to do, the earth itself, is a road to glory. In the Edda it is the three-coloured bridge Bifroset, the "quivering track" over which the gods walk, and of which the red is fire, so that the Frost-giants may not cross it. In Persian myth it is Chinvad, the "bridge of the gatherer," flung across the gloomy depths between this world and the home of the blessed; in Islam it is El-Sirat, the bridge thin as a hair and sharp as a scimitar, stretching from this world to the next; among the Greeks it was Iris, the messenger from Zeus to men, charged with tidings of war and tempest; to the Finns it was the bow of Tiernes, the god of thunder; whilst to the Jew it was the messenger of grace from the Eternal, who did set "his bow in the clouds" as the promise that never again should the world be destroyed by flood. Such belief in the heavens as the field of activities profoundly affecting the fortunes of mankind, and in the stars as influencing their destinies, has been persistent in the human mind. The delusions of the astrologer are embalmed in language, as when, forgetful of a belief shared not only by sober theologians, but by Tycho Brahe and Kepler, we speak of "disaster," of our friends as "jovial," "saturnine," or "mercurial." But the illusions of the savage or semi-civilised abide as an animating part of many a faith, undisturbed by a science which has swept the skies and found no angels there, and whose keen analysis separates for ever the ancient belief in a connection between the planets and man's fate. For convenience' sake, we retain on our celestial maps and globes the men and monsters pictured by barbaric fancy in the star-positions and clusters, noting these as interesting examples of survival. Yet we are the willing dupes of illusions nebulous as these, and, charm he never so wisely, the Time-Spirit fails to disenchant us.

If the sun and moon are the parents of the stars, the heavens and the earth are the parents of all living things. Of this widely-found myth, one of the most striking specimens occurs among the Maoris. From Rangi, the heaven, and Papa, the earth, sprang all living things; but earth and sky clave together, and darkness rested on them and their children, who debated whether they should rend them asunder or slay them. Then Tane-mahuta, father of forests, reasoned that it was better to rend them, so that the heaven might become a stranger, and the earth remain as their nursing-mother. One after another they strove to do this, but in vain, until Tane-mahuta, with giant strength and strain, pressed down the earth and thrust upward the heaven. But one of his brothers, father of wind and storm, who had not agreed to this parting of his parents, followed Rangi into the sky, and thence sent forth his progeny, "the mighty winds, the fierce squalls, the clouds dense and dark, wildly drifting, wildly hunting," himself rushing on his foe, snapping the huge trees that barred his path, and strewing their trunks and branches on the ground, while the sea was lashed into high-crested waves, and all the creatures therein affrighted. The fish darted hither and thither, but the reptiles fled into the forests, causing quarrel between Tangaron, the ocean-god, and Tane-mahuta for giving them shelter. So the brothers fought, the ocean-god wrecking the canoes and sweeping houses and trees beneath the waters, and had not Papa hidden the gods of the tilled food and the wild within her bosom, they would have perished. Wars of revenge followed quickly one upon the other; the storm-god's anger was not soon appeased; so that the devastation of the earth was well-nigh complete. But, at last, light arose, and quiet ensued, and the dry land appeared. Rangi and Papa, parted for ever, quarrelled no more, but helped the one the other, and "man stood erect and unbroken on his mother Earth."

THE CHEMISTRY OF COOKERY.

IX.

By W. Mattieu Williams.

HAPPY little couples, living in little houses with only one little servant—or, happier still, with no servant—complain of their little joints of meat, which, when roasted, are so dry, as compared with the big succulent joints of larger households. A little reflection on the principles applied in my last to the grilling of steaks and chops will explain the source of this little difficulty, and I think show how it may be overcome.

I will here venture upon a little of the mathematics of cookery, as well as its chemistry. While the weight or quantity of material in a joint increases with the cube of its through-measured dimensions, its surface only increases with their square—or, otherwise stated, we do not nearly double or treble the surface of a joint of given form when we double or treble its weight; and *vice-versâ*, the less the weight, the greater the surface in proportion to the weight. This is obvious enough when we consider that we cannot cut a single lump of anything into halves without exposing or creating two fresh surfaces where no surfaces were exposed before. As the evaporation of the juices is, under given conditions, proportionate to the surface exposed, it is evident that this process of converting the inside middle into two outside surfaces must increase the amount of evaporation that occurs in roasting.

What, then, is the remedy for this? It is twofold. First to seal up the pores of these additional surfaces as completely as possible, and secondly to diminish to the utmost the time of exposure to the dry air. Logically following up these principles I arrive at a practical formula which will probably induce certain orthodox cooks to denounce me as a culinary paradoxer. It is this. That *the smaller the joint to be roasted, the higher the temperature to which its surface should be exposed.* The roasting of a small joint should, in fact, be conducted in nearly the same manner as the grilling of a chop or steak described in my last. The surface should be crusted or browned—burned, if you please—as speedily as possible in such wise that the juices within shall be held there under high pressure, and only allowed to escape by burst and splutters, rather than by steady evaporation.

The best way of doing this is a problem to be solved by the practical cook. I only expound the principles, and timidly suggest the mode of applying them. In a metallurgical laboratory, where I am most at home, I could roast a small joint beautifully by suspending it inside a large red-hot steel-melter's crucible, or better still in an apparatus called a "muffle" which is a fireclay tunnel open in front, and so arranged in a suitable furnace as to be easily made red-hot all round. A small joint placed on a dripping-pan and run into this would be equally heated by all-round converging radiation, and exquisitely roasted in the course of about ten to thirty minutes, according to its size. Some such an apparatus has yet to be invented in order that we may learn the flavour and tenderness of a perfectly-roasted small joint of beef or mutton.

For roasting large masses of meat, a different proceeding is necessary. Here we have to contend, not with excessive surface in proportion to bulk—as in the grilling of chops and steaks, and the roasting of small joints—but with the contrary—*viz.*, excessive bulk in proportion to surface. If a baron of beef were to be treated according to my prescription for a steak, or for a single wing rib, or other joint of three to five pounds weight, it would be charred on its surface long before the heat could reach its centre.

A considerable time is here inevitably demanded. Of

course, the higher the initial outside temperature, the more rapidly the heat will penetrate; but we cannot apply this law to a lump of meat as we may to a mass of iron. We may go on heating the outside of the iron to redness, but not so the meat. So long as the surface of the meat remains moist, we cannot raise it to a higher temperature than the boiling point of the liquid that moistens it. Above this, charring commences. A little of such charring, such as occurs to the steak or small joint during the short period of its exposure to the great heat, does no harm; it simply "browns" the surface; but if this were continued during the roasting of a large joint, a crust of positively black charcoal would be formed, with ruinous waste and general detriment.

As Rumford proved long ago, liquids are very bad conductors, and when their circulation is prevented by confinement between fibres, as in the meat, the rate at which heat will travel through the humid mass is very slow indeed. As few of my readers are likely to fully estimate the magnitude of this difficulty, I will state a fact that came under my own observation, and at the time surprised me.

About five and twenty years ago I was visiting a friend at Warwick during the "mop," or "statute fair"—the annual slave market of the county. In accordance with the old custom, an ox was roasted whole in the open public market-place. The spitting of the carcass and starting the cookery was a disgusting sight. We are accustomed to see the neatly-cut joints ordinarily brought to the kitchen; but the handling and impaling of the whole body of a huge beast by half-a-dozen rough men, while its stiffened limbs were stretching out from its trunk, presented the carnivorous character of our ordinary feeding very grossly indeed.

Nevertheless I watched the process, and dined on some of its result. The fire was lighted before midnight, the rotation of the beast on the horizontal spit before it began shortly after, and continued until the following midday, all this time being necessary for the raising of the inner parts of the flesh to the cooking temperature of about 180° Fahr.

Compare this with the grilling of a steak, which, when well done, is done in a few minutes, or the roasting of the small joint as above within thirty minutes, and you will see that I am justified in dwelling on the great differences of the two processes, and the necessity of very varied proceeding to meet these different conditions.

The difference of time is so great that the smaller relative surface is insufficient to compensate for the evaporation that must occur if the grilling principle, or the pure and simple action of radiant heat, were only made available, as in the above ideal roasting of the small joint.

What, then, is added to this? How is the desiccating difficulty overcome in the large-scale roasting? Simply by *basting*.

All night long and all the next morning men were continuously at work pouring melted fat over the surface of the slowly-rotating carcase of the Warwick ox, skilfully directing a ladleful to any part that indicated undue dryness.

By this device the meat is more or less completely enveloped in a varnish of hot melted fat, which assisted in the communication of heat, while it checked the evaporation of the juices. In such roasting the heat is partially communicated by convection through the medium of a fat-bath, as in stewing it is all supplied by a water-bath.

I purpose making an experiment, whereby this principle will be fully carried out. I shall melt a sufficient quantity of mutton fat to form a bath, in which a small joint of mutton may be immersed, or of beef fat for beef; and then keep the melted fat at about the cooking temperature, or a little above it—say the boiling point of water, which will be indicated by the spluttering due to the evaporation of the water in the meat. The result of this experiment will be duly reported to the readers of KNOWLEDGE when I reach the general subject of frying. In my next I must continue this subject of roasting, which is by no means exhausted yet. Count Rumford devotes seventy pages to it, and I quote his words for my own use. He says,* "I shall, no doubt, be criticised by many for dwelling so long on a subject which to them will appear low, vulgar, and trifling; but I must not be deterred by fastidious criticisms from doing all I can do to succeed in what I have undertaken. Were I to treat my subject superficially, my writing would be of no use to anybody, and my labour would be lost; but by investigating it thoroughly, I may, perhaps, engage others to pay that attention to it which, from its importance, it deserves."

In my last, col. 1, page 247, is an error that must have puzzled some readers: on line 16, for "dissected," read "desiccated."

THE *Boston* (U.S.A.) *Evening Transcript*, in referring to electric companies generally, says the best that can be said in their favour is that they are now endeavouring to do as little business as possible, for the more they do the more they lose. [Of some companies this is quite true, but certainly not of all.]

IT is stated that one of the palace cars belonging to the United States Fish Commission started recently for California with a passenger list of young fish numbering 18,000. The middle part had an aisle running through the centre, and in place of the seats on each side, were wooden ledges, about 3 ft. high, on which were placed the tin fish-tanks. The fish were not placed in the tanks filled with water, as the motion of the train would dash the water about and destroy many lives among the young passengers. But, instead, about twenty fish were placed in gallon tin pails, and these pails were put in the tanks, and then the latter filled with water. With the carp, however, the water in the pails was sufficient, and the motion of the car tended to the circulation of air in the water, keeping it fresh. The attendants renewed the water every eight hours, and kept a careful watch to remove any fish that might have died. The percentage of fish lost by death, however, was very small.

THE *Railway Review* (Chicago, March 24) quotes from the *Medical and Surgical Journal* some very unfavourable comments upon a Bill lately introduced into the United States Legislature, to put a stop to the use of any test for the form and colour sense of railway employés, except by the railway signals themselves. This paper states that it has been repeatedly and clearly shown that not even the most skilled experts can detect colour-blindness or decide upon a man's eyesight by any use of the railway signals. On the other hand, a very few minutes with the most practical test used by the Government will settle whether a man is safe or not. There is strong reason to believe that the seemingly plausible argument of allowing experts or others to test only by railway signals, arises from the desire to break down the law which practically prevents the colour-blind or purblind from holding positions in which their defects endanger lives and property.

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* "Essays Political, Economical, and Philosophical." Vol. III., page 129.

A NATURALIST'S YEAR.

By Grant Allen.

XII.—TWO LITTLE GREENISH FLOWERS.

OUT of the bank beside the lane I have just picked two very inconspicuous, yet very pretty, little greenish wild flowers. Most people, I suppose, hardly know that such things as green flowers exist at all; and yet, perhaps, half our English weeds have really blossoms in which green is either the prevalent or the only colour. The fact is, both our tastes and our observations in this matter are still more or less barbaric? we notice and gather all the bright blue and crimson and yellow flowers, but pass by their little green sisters in the hedge-rows or meadows quite unheeded. Thus, as a rule, we confine our attention entirely to those large and conspicuous species which depend for fertilisation upon the larger insects, while we leave out of consideration those graceful, waving, pendulous kinds which trust rather to the friendly offices of the summer breezes.

The little green blossoms which I have picked to-day, however, belong to rather a different class from the true wind-fertilised species, such as the grasses and catkins. Thorough-going wind-flowers have usually lost their petals altogether, like the sedges and reed-maces, or have reduced them to mere rudiments, like the grasses, or else have tucked them away inconspicuously behind their calyx, like the plantains; so that all you can see of their inflorescence —with the naked eye, at least, or without dissection—is a clustered spike or pannicle of waving stamens and feathery styles. But the little flowers I have picked from the bank here are not nearly so degenerate or so much reduced in plan as that. This pretty, delicate, pale-green plant that I hold in my hand is moscatel, probably a distant relation of the elder, though it is but a slender, very dainty herb, instead of a stout, woody bush. Its rootstock, you see, forms a sort of semi-transparent bulb, from which springs a tall stalk, bearing, half-way up, a pair of divided opposite leaves, and surmounted at the top by a little globular head of dainty green flowers. In colour they almost exactly resemble the leaves, but in shape and general appearance they are extremely like the familiar little scarlet pimpernel. In fact, the blossoms are so pretty in their symmetry and delicacy that, though nobody ever notices them till they are pointed out, everybody is always surprised at their singular beauty when attention has once been directed to their shape and colour.

Looking closely into the little heads, you can see that each one usually consists of five flowers, one on top and four below. The upper or central flower has generally two sepals to its calyx and four lobes to its corolla; the lower or lateral ones have generally three sepals and five lobes. Why is this? Well, the reason is simply one of obvious convenience. The central flower, crowded between its four neighbours, has only just room to expand a single lobe in each interspace; the lower flowers, less cramped in their development, can ordinarily manage to find a place for the full normal number of five lobes, which they inherit from all their ancestors. But in stunted specimens, or in very knobby heads, you will often find that one or more of the lower blossoms has also been reduced by the pressure of its neighbours to the four-lobed condition. This is all the more interesting because their close relations, the dogwoods and galiums, have almost always only four; though even here a few conservative species still manage to produce the original five petals of the ordinary dicotyledonous corolla.

If you pull off the corolla from one of the blossoms, it comes away in a single piece, with the stamen sticking to it, just as in elder-blossom or laurustinus When you come to count the stamens, however, you will find that there are apparently eight in the four-lobed flowers, and ten in the five-lobed, instead of four and five respectively as in all their other congeners. Each of these stamens is, in fact, only a half stamen; the original five have split up into ten, as you can easily see from the fact that there are two in the interval between each lobe of the corolla. This curious arrangement is related, I believe, to the peculiar method of fertilisation adopted by the plant. It lays itself out specially to attract small flies, which seem to care very little in this case for the allurement of colour. If you look closely at the little ring on the corolla, where the stamens are inserted, you will observe between each pair a tiny glistening drop of sticky liquid. That liquid is the honey; and it is placed thus openly on the flat surface of the flower, instead of being concealed at the bottom of a deep tube, on purpose to accommodate the little flies, which seem to be enticed to it mainly by the sense of smell. Each half stamen bends over, when ripe, towards the honey; so that the insect is sure to rub against it while sipping the nectar, and to brush it off against the five stigmas of the next flower he visits in due course.

The other little weed which I have picked from the same bank is much yellower and more conspicuous than the moscatel, though not nearly so pretty. It is a saxifrage by family, and is commonly known as golden saxifrage, though the botanists make it into a separate genus, and call it chrysosplenium. It is interesting to compare this plant with moscatel, both because of its resemblances and of its differences. At first sight the likeness is very close; you would say, roughly speaking, that it had a small four-lobed flower with eight stamens, as in the central blossom of its greener neighbour. But when you come to look closer, you see that there is apparently no trace of a calyx, and that the eight stamens are really eight, instead of four split pairs. They stand in two whorls of four each; and when they begin to wither it is easy to distinguish the outer from the inner whorl. Now, in all the books on botany you will find it written that golden saxifrage has a calyx, but no corolla; indeed, it is almost a point of faith with botanists of the old school, that whenever a flower has only one floral envelope, as they call it, that envelope should be considered as a calyx. It seems to me quite clear, however, that in this case it is the calyx that has disappeared, while the four lobes form a real corolla. For the stamens of the outer whorl alternate with the lobes, instead of being opposite them; and, I believe, wherever the petals have been suppressed, the stamens stand opposite the sepals, as in nettles and goose-foots, instead of alternately with them, thus leaving, as it were, a blank in the place where the petals ought to be. It is easy enough to understand how in rather succulent plants, like the saxifrages, the very small and adherent calyx might become so united with the petals as to disappear altogether. Indeed, there are many allied plants in which the calyx can only be distinguished as a very small rim or edge outside the petals.

Moreover, golden saxifrage helps us to understand the steps by which moscatel has become green. It is itself a greenish-yellow in hue; but though it is fertilised by very small miscellaneous insects, it still finds it worth while to attract them by some faint show of colour. Moscatel, on the other hand, being apparently very restricted in its natural range of insect guests, can afford to dispense with colour altogether. Why some flowers of this sort should find they get along better with green petals is a little diffi-

cult to understand; but there certainly are some which, in spite of being fertilised by insects, do prefer green to any gaudier or brighter hue. They are generally small, but not minute blossoms. Knawel, lady's mantle, and moscatel are but a few which could be named belonging to this small green class. They all seem to be fertilised by little flies, and their honey, when they have any, is secreted quite openly on the face of the flower. There are a good many puzzles of such a sort still remaining even in British botany; and I mention this one only in order to call attention to the kind of question which yet needs an answer at the hands of observing naturalists.

THE GEOLOGY OF THE ISLE OF MAN.

By W. Jerome Harrison, F.G.S.

THE main feature of the surface of the Isle of Man is a ridge running from Maughold Head (S.E. of Ramsey) to the Calf of Man, a distance of thirty miles. The highest point of this rocky backbone just exceeds 2,000 ft. at Snaefell, but Greebah and South Barrule both approach

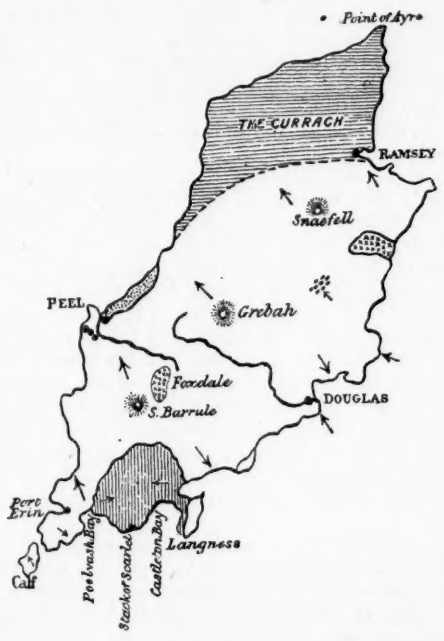


Fig. 1.—Geological Sketch-Map of the Isle of Man.

Skiddaw Slates.
Grit in ditto.
Conglomerate.
Alluvium.
Carboniferous Limestone.
Granite.
→ Direction of Dip.

1,600 ft. From the line of hills so formed, the surface slopes down on either side to the sea, the width of the Isle (at right angles to its mountain axis) being from ten to twelve miles. A low flat plain, called the Curragh, occupies about fifty square miles north of a line drawn from Ramsey through Bishop's Court to Peel.

In studying the geology of this isolated tract, we have a great advantage in the fine sections of the rocks displayed in the cliffs all round the coast. Inland, indeed, good exposures are not common; the strata are so overlaid by beds of sand, clay, and peat of recent origin, and the hill-slopes are so well covered by grass, that the hard rocks which lie beneath are only to be examined at wide intervals.

If a geologist has only two or three days to spend on the island, he should make at once for Castletown, as the neighbourhood of that town affords by far the most interesting and varied display of the strata. Within a fortnight or three weeks it is, however, quite possible to examine the entire rocky structure of the island, so far as it is visible.

The Government Geological Survey has not yet visited Manxland, so that Sheet 100 of the Ordnance Survey Map cannot be purchased "geologically coloured." The late Rev. J. G. Cumming did good and careful work among the rocks, and published his results as part of his excellent book on "The Isle of Man" (1848), and also in the "Journal of the Geological Society of London" (vol. II., p. 317). Of recent papers, those by Mr. Jno. Horne in 1874 ("Trans. Edinburgh Geol. Soc.," Vol. II.), and the late Rev. J. C. Ward in 1880 (*Geological Magazine*, p. 1), are well worth reading.

Silurian Formation.—Three-quarters of the surface of Mona is formed of rocks of Lower Silurian age. The fine sections exposed in the cliffs show hard rocks of varying texture, all of which were deposited as mud on a sea-floor, but which have since been so hardened, that the sandy mud is now a rough stone called *grit*; while the fine mud has formed hard *shales*, which are sometimes cleaved, then becoming a true slate. There must be a total thickness of perhaps five or six thousand feet of these Silurian rocks in the Isle of Man, and yet such appears to have been the paucity of life in the seas in which they were originally deposited, that this enormous thickness of strata has only yielded a single species of fossil, viz., *Palæochorda major*, once considered to be a fucoid (seaweed), but now known to represent the meandering burrow of a species of marine worm.

This fossil, and the general similarity of the strata, help us to identify the Lower Silurian rocks of the Isle of Man with the Skiddaw Slates of Cumberland, and again, through them, with the Arenig beds of Wales. A hard band of grit is very noticeable at the base of the Arenig slates in North Wales; it occurs in the Lake district, and a somewhat similar bed, which crops out at Carn Gerjoil (S.E. of Snaefell), and on St. Ann's Head, may represent it in the Isle of Man. The hills forming the central ridge of the island are composed of hard grey slaty shales and flags; The quarries at South Barrule show true slates of a black hue, upon which, to the west, rest soft black shales.

Owing to slow and long-continued movements of the earth's crust in bygone ages, these old slaty rocks have been bent into a double curve. A line drawn from south of Ramsey to Crosby (west of Douglas), and thence to Port Erin, will indicate an *anticlinal* axis or line, *from which* the strata dip in opposite directions; those on the Douglas side inclining at a high angle to the south-east, and those on the Peel side dipping towards the north-west. Beyond (or east of) Douglas, however, from the Dock to the Head, the strata rise up again, and the dip here is westerly. At Spanish Head, in the extreme south of the island, bluish flaggy slates lie horizontally, and are traversed by narrow vertical cracks of great depth, called the "Chasms." The strata here probably form the crown of an anticlinal or arch, a position in which they would

be under great strain, and consequent liability to fracture. (Fig. 2.)

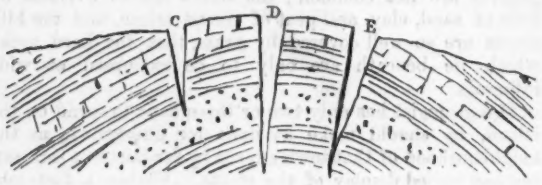


Fig. 2.—Strata forming an anticlinal curve or saddle. The strain has caused the beds to fracture, so forming the fissures C, D, E.

It is very desirable that these Silurian rocks should be more thoroughly searched for fossils; *graptolites* ought to occur in them, for forty species are known in the Skiddaw Slates.

Granite bursts through the Silurians at two points—viz., at Doon, near Laxey, and near Foxdale, about two miles north-east of South Barrule. In each case the intrusive rock has shattered the Silurian shales of the neighbourhood, and heated water, traversing the fissures so formed, has filled them with various minerals, including much lead-ore (*galena*), zinc-ore (*blende*), and a little copper-ore. The lead-ore is richly impregnated with silver. In the year 1879, the Laxey mines produced 7,200 tons of zinc-ore, worth £27,000, and 1,200 tons of lead-ore (containing 40,000 oz. of silver), value £20,000. In the same year, the Foxdale mines produced 2,750 tons of lead-ore (containing 55,000 oz. of silver), value £37,000.

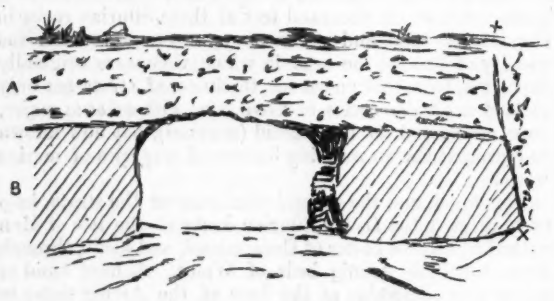


Fig. 3.—Section at Langness, showing the conglomerate resting unconformably on the Skiddaw Slates.

B. Skiddaw Slates.
A. Conglomerate forming base of Carboniferous Limestone.
× Fault.

Lower Carboniferous Formation.—On the west side of the promontory of Langness, east of Castletown, a conglomerate of varying thickness (5 to 50 ft.), containing many quartzite pebbles, rests very unconformably on the Silurian slates (see Fig. 3). Traced northwards, towards the College, the conglomerate gradually passes upwards into a limestone—the well-known carboniferous or mountain limestone. At Peel, beds of red sandstone are seen similarly to rest on the slates, forming a strip about two miles in length, and perhaps 300 ft. in thickness. These red beds at Peel dip north-west towards the sea, and are overlaid by limestone, which, however, is beneath the water. Both the conglomerate of Langness and the red sandstones of Peel were formerly assigned to the period of the Old Red Sandstone, a formation which Hugh Miller did so much to render famous; they have yielded no fossils, and it is certain that they really form the base of, and belong to, the Carboniferous Limestone.

The latter rock itself occupies an area of ten or twelve square miles in the extreme south of the island round Castletown. It forms a "happy hunting-ground" for the fossil-seeker, for Cumming obtained no fewer than 222 species of shells, &c., from Poolvash. The strata lie in a trough, or synclinal, dipping towards a common axi (see map). The lowest beds are brownish limestones, with partings of shale, exposed in two quarries at Castletown, and altogether about 200 ft. in thickness. These are overlaid by the light-coloured limestones of Poolvash, while the hard dark-coloured limestone (called black marble), worked in a quarry south of Poolvash, forms the highest known stratum. It is the upper beds which are most fossiliferous, and they contain a remarkable mixture of ferns and calamites with marine shells, indicating the proximity of land at the time of their formation. Thin, corrugated shells of the genus *Posidonia* characterise these upper limestones.

Although the carboniferous rocks only occur at two points in the Isle of Man (Castletown and Peel), yet, if an elevation of the district were to take place, we should doubtless find the red sandstone and the limestone completely encircling the Silurian strata, but at present the later-formed rocks of Carboniferous age lie under water, except at the two points just mentioned.

Igneous Rocks.—The coast-line between Castletown and Poolvash affords most interesting evidence of volcanic action during early Carboniferous times. The Stack of Scarlet is a boss of basalt which fills an ancient pipe or vent; a dyke of similar rock runs from it in a north-west direction, while beds of volcanic ash are interstratified with the neighbouring limestones.

Glacial Period.—Beds of clay, sand, and gravel, rest irregularly upon the edges of the Silurian and Carboniferous rocks which form the solid geology of the Isle of Man. On the south of Ramsey, a bluish sandy clay, containing boulders of Scotch granite, is seen resting upon the slates; it is overlaid by a bed of sand 10 ft. thick, above which is a second bed of boulder clay, 6 ft. thick, containing scratched stones, &c. A bluish clay full of stones covers most of the limestone in the south of the island; when it is removed, the surface of the rock beneath is frequently seen to be grooved. All this boulder clay was brought by a large glacier which, during the glacial period, advanced from the south of Scotland, ploughing its way down the Irish Sea, and grinding over the Manx hills—a fact to which their rounded and mammillated outlines still bear witness.

This period of intense cold was succeeded by a steady, though slow, submergence. Down went the island! Not a peak remained to tell of its existence, or to afford a refuge for a vestige of that alpine flora which elsewhere contrived to linger on, and which still exists on the Welsh and Cumbrian hills. It is to the lifting action of coast ice, continued during this depression, that we must look for an explanation of the fact that numerous blocks of the Foxdale granite have been raised more than 600 feet, so that they now lie on the very top of South Barrule—a mountain only a mile and a half south of the Foxdale boss.

Post-Glacial Beds.—The submergence alluded to above was succeeded by an elevation so great, that the entire floor of the Irish Sea appeared above the waters, and the British Isles formed a peninsula jutting out from the western coast of Europe. The flat surface of the Curragh formed a part of this old plain, whose surface was studded with small lakes and peat bogs; the Great Irish Elk roamed freely over the district, and individuals got bogged and lost their

lives; their bones are now often found in the marl pits of the Curragh. Numerous marine shells of species still living in our seas also occur in the sands and gravels of this northern flat portion of the island.

MR. MONCURE D. CONWAY, in a remarkable paper in the *Newcastle Weekly Chronicle*, points out that, though the so-called cultured conceal the Tartar in their nature at home, save in such matters as Sabbatarianism, oaths, and prosecutions for blasphemy, it comes out when they are away from home—not the schoolmaster, but the savage is seen abroad.

THE news of the defeat of the Affirmation Bill was received with wild rejoicings in Ireland—naturally, for *there* even the Invincibles religiously preface their villanies with "So help me, God" (and valiantly break their oath quite traverse). Donaghadee and other centres of culture were illuminated.

EREWHON INTELLIGENCE.—"Year 1723 before end of world, Oct. 3.—It has been the custom in our enlightened country, all Erewhoners know, to regard as an offence punishable by fine or imprisonment, the use of statements not confirmed by oaths of suitable strength. A measure is to be brought forward at the next session of our National House, which seems intended to free Erewhoners of lax morality from this religious obligation. . . . " Nov. 10. —"Strong feeling is excited throughout the length and breadth of Erewhon against the proposed measure. Sir Average Dullard has addressed his constituents at Bigotsbury, the far-famed capital of Hypocrisia, roundly abusing what he characterised as a measure 'for removing the Creator from conversation.' Lord Borne Savage has also addressed a large gathering of the Erewhoners of Tartarshire, denouncing a measure which would not only permit the cultured to omit from their discourse the 'So help me, God,' which even the inhabitants of Erewhyna employ (at least their noblest race, the so-called Invincibles of Ireland do so, we understand), but would deprive our highly-religious lower classes of the privilege of hearing at every third sentence, as now, the more familiar 'S'help me' and 'S'wulp me' of the vernacular . . . . *Hiatus valde defendus* . . . ." "Year 1722 B.E. of W., May 3. The hateful measure introduced by an Atheistico-Agnostico-Materialistic Government has been defeated by ten votes, amid a scene of wild enthusiasm. The followers of Sir Average threw their parti-coloured caps into the air, and the customary tokens of applause were given in a series of prolonged brayings. It is believed that Lord Borne Savage will soon take his place at the helm of State." "May 4. Eedaghanod is illuminated by bonfires, and it is believed that the example will soon be followed by other cities equally representative of Erewhon culture. Those among our people who justly claim (whatever the enemy may say about shams) to be more earnestly religious than their fellows may rest happy—the cause of religion is saved." . . . . Another *hiatus* . . . . "Year 1720, Before End of World, May 20. The measure thrown out in 1723 is now passed, after months of contest. The short-sighted objections urged against it in 1723 and 1722 are now estimated at their true value. But Dnalire is mourning, and there is grief throughout Hypocrisia; beadles and vestrymen gnash their teeth (such as remain), and churchwardens propose to clothe themselves in sackcloth and ashes."—1718, B.E.W. . . . . [Answer to correspondent.]—"It is well known that all well-disposed and religious persons supported in 1723 the measure relating to oaths which is now the law of the land."—Extracts from sundry files of the *Erewhon Times*.

FLYING FOXES IN AUSTRALIA.

ONCE I visited a great "camp" of fruit-eating bats, "flying foxes," as they are here called (*Pteropus poliocephalus*).

In a dense piece of bush, consisting principally of young trees, the trees were hung all over with these bats, looking like great black fruits.

As we approached, the bats showed signs of uneasiness, and after the first shot were rather difficult to approach, moving on from before us and pitching in a fresh tree some way ahead.

The bats uttered a curious cackling cry when disturbed. They were in enormous numbers, and although thousands had been shot not long before by a large party got together for the purpose, their numbers were not perceptibly reduced. They do great harm to the fruit orchards about Paramatta, and the fruit-growers there organise parties to shoot them. They have the cunning to choose a set of trees where the undergrowth is exceedingly dense, and where it is, therefore, difficult to get at them. I shot seven or eight, but they are very apt to hang up by their hooked claws when shot, and I lost several. I could find no Nycteribia living on these bats, although these insects are usually so common on the various species of Pteropus.—*Prof. Mosely.*

THE prizes and diplomas awarded to exhibitors at the Crystal Palace Electrical Exhibitions of 1882 were distributed on Wednesday week by the Duke of Teck.

THE following passages from the excellent and really judicial summing up of Lord Coleridge, in the *Freethinker* trial, are well worth studying, especially by Mr. Justice North:—"It is true (if we regard this prosecution as a piece of persecution) that persecution, unless thoroughgoing, seldom succeeds. . . . . And, therefore, no doubt the observation is correct, that, as a general rule, persecution, unless far more extreme than in England in the nineteenth century is possible, is certain to be in vain. It is also true, and I cannot help assenting to it, that it is a very easy form of virtue. It is a more difficult form of virtue quietly and unostentatiously to obey what we believe to be God's will in our own lives. It is not very easy to do it; and it makes much less noise in the world. It is very easy to turn upon somebody else who differs from us, and in the guise of zeal for God's honour to attack somebody for a difference of opinion whose life may be more pleasing to God and more conducive to His honour than our own. And when it is done by persons whose own lives are not free from reproach, and who take that particular form of zeal for God which consists in putting the criminal law in force against others, that, no doubt, does more to create a sympathy with the defendant than with the prosecutor. And if it should be done by those who enjoy the wit of Voltaire, and who do not turn away from the sneers of Gibbon, and rather relish the irony of Hume, our feelings do not go with the prosecutors, and we are rather disposed to sympathise with the defendant. It is still worse if the person who takes such a course takes it, not from a kind of notion that God wants his assistance, and that he can give it—less on his own account than by prosecuting others—but it is mixed up with anything of partisan or political feeling, then nothing can be more foreign to what is high-minded, or religious, or noble in men's conduct; and, indeed, it seems to me that any one who will do that, not for the honour of God, but for the purpose of the ban, deserves the most disdainful disapprobation."

XUM

THE ARCHER FISH.

THE archer fish (*Toxotes jaculator*) belongs to a group or sub-family of the scale-finned fishes (*Squamipinyes*), so-called because the "vertical fins are more or less densely covered with small scales." The principal characteristic of this fish is the elongated lower jaw. The inhabitants of Java, its native island, keep these fish in their houses as pets. They are sometimes twenty centimètres in length. The colouring of the upper part of the fish is greenish-gray, the under part silvery; there are four short wide bands across the back, dark brown, with a shade of green.

With few exceptions, all of the scale-finned fishes are found in the upper stratum of the water and near the shore; some of them descend into the ocean, and others occasionally wander out into the sea, following ships for their refuse, or chasing other prey. Most of them, especially the beautifully coloured species, belonging to this

family, are found, as a rule, in the vicinity of reefs, or above shallow places, playing in the sunshine. Their beauty is very much heightened by motion.

Heuglin says that in the Red Sea they are commonly observed in the deep chasms or well-like depressions between the coral reefs, where the water is always clear and quiet, although there may be a high sea outside.

When a ship anchors in a dark night between the reefs, the presence of these fish may be perceived by their phosphorescence.

They may be observed, often at a considerable depth, faintly glowing spots; suddenly they disperse like scattering sparks, move slowly to and fro, gather together in groups, and separate again.

Nearly all the fishes of this family are carnivorous, feeding upon small medusæ, coral insects, &c. These fish, Heuglin says, play around the coral branches in the same manner as birds hover around trees upon the land.

In crowds they stand still for a few minutes before a branch of a coral, suddenly dart forward, bite at the coral insects on the branches, and hasten as if inspired by a spirit to another place, to go through the same play, and begin again the same chase.

As soon as the archer fish sees a fly or any other insect sitting upon a plant hanging over the water, it approaches to within about one or one and a half mètres (4 or 5 feet), and spurts from its mouth a drop of water, so violently and with such accuracy that it seldom misses its prey.

It has this habit even in captivity, and the Japanese make a household pet of it. They keep the fish in water basins, and place in the middle of the vessel a stick, sometimes reaching out over the water sixty centimètres (2 feet). In the stick wooden pins are fixed, and insects are fastened upon them. Soon after this is done, the fish swims around the stick, comes up to the surface of the water, raises its eyes toward the surprised insect, suddenly spurts a drop of water upon it, throws it down, and swallows it if its shot is successful; if not, it swims around the stick and tries again. The certainty with which they throw this jet of water upon their victims is wonderful.

In order to observe this, Hommel thrust a needle through a fly and fastened it to the stick. Without intermission, rapidly, and in regular order, all of his fish attempted to throw the fly down, without once missing their aim as they shot the drops of water upon it.

Insects appear to be the most natural food for this species, and seem to be preferred to every other kind of food.—*From Thierleben, by A. E. Brehm.*

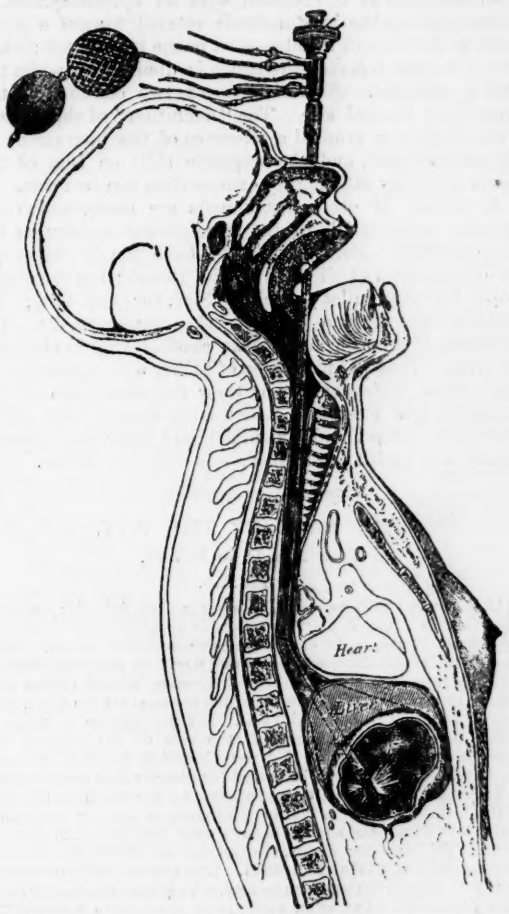
THE ELECTRIC LIGHT IN SURGICAL DIAGNOSIS.

WE find in a recent number of *Annals of Anatomy and Surgery* a very interesting contribution by Dr. Roswell Park, of Chicago, in which he describes the most recent applications of the electric light for surgical purposes. It appears that Josef Leiter, a well-known instrument maker of Vienna, has at last succeeded in producing electrical instruments by which the interior portions of the human body may be strongly illuminated by the electric light, and thoroughly examined by the eye of the surgeon.

The accompanying engraving shows the application of one form of these new instruments, called the gastroscope, an instrument for the examination of the stomach. It consists of a bent tube, which contains a window at one end, electric wires, tubes for the introduction of a water circulation, by means of rubber bags, for the purpose of keeping the tube cool while the electric light is burning; also for the introduction of water into the stomach to distend the same. The lower extremity of the tube is provided with a platinum wire, which is made to glow under the electric current, which is produced by a battery. The tube is also provided with reflector prisms and lenses for directing the light through the tube.

The eye of the surgeon is applied at the upper end of the tube, after it has been inserted in the stomach in the manner indicated in our sketch.

As preparation for the use of the gastroscope, it is necessary that the patient shall have gone for some hours



without eating. Half-an-hour previous to its use a hypodermic dose of morphia, say one-third grain, should be administered. Just prior to the examination the stomach should be washed out. The patient is then laid upon the left side on a table, having a head support, which shall keep the neck in its axial position. A small receptacle is placed under the mouth to catch the saliva which cannot be swallowed. The head is then thrown well back, and the instrument, which has previously been lubricated with vaseline or glycerine, is guided by the finger of the left hand, and passed downward with a gentle sweep.

Previous practice on the cadaver with a hard rubber sound of the same dimensions and flexure as the gastroscope will easily teach the necessary manipulations. The instrument being in place, the stomach is inflated to the

desired extent, but not sufficient to distress the patient. The pointer on the rheostat being turned slowly, the metal blind is drawn (at J.), and the observer has the field before him.

By the curve in the tube not only is the introduction of the instrument facilitated—it having been found impossible to pass a perfectly straight tube so far as is necessary for this purpose—but it will be seen that, with partial rotation of the tube about the long axis of the straight portion, the extremity carrying the window and the light makes quite an excursion, and permits the view of a much more extensive surface than would be possible were no such excursion made.

Moreover, as it is provided with an optical system, it obtains, that as the instrument is rotated toward a given point of the mucous membrane its image is enlarged; while as it is further removed the image is diminished, while the field is enlarged. At a distance of two centimètres the image is of natural size. The "definition" of this system is excellent, and granted a tolerance of the instrument on the patient's part, and the requisite skill on that of the observer, a very satisfactory examination can be made.

A variety of other instruments are made, which are operated substantially in the same general manner as the one described. For example, we have the laryngoscope, for examination of all parts of the throat; the œsophagoscope, for the gullet; the otoscope, for the ears; the urethroscope, for the bladder; the cystoscope, &c. The invention of instruments marks another step in electrical progress. They promise to be of utility and importance to the medical profession, for by their use many parts of the human system heretofore hidden from the eye may now be brilliantly lighted and examined, and their condition in disease and health ascertained.—*Scientific American.*

THE FACE OF THE SKY.

From May 11 to May 25.

By F.R.A.S.

THE student will, as usual, watch the Sun daily for spots and faculæ. Map V. of "The Stars in their Seasons" will show the aspect of the night sky during our specified period. From May 22 to July 30 there will be no real night in England; twilight existing from sunset to sunrise. Mercury is still visible after sunset, towards the W.N.W. part of the horizon. On the 22nd, 23rd, and 24th he will be below β Tauri. For the purpose of those for whom these notes are intended, the rest of the planets, save Uranus, are now visible. Uranus himself is sensibly stationary above τ Leonis. He must be looked for directly it is dark enough.

There will be two occultations of stars by the moon on the night of the 17th. The first is that of χ Virginis, of the 5th magnitude, which will disappear at the moon's dark limb at 9 h. 27 m. at an angle of 79° from her vertex, reappearing at her bright limb at a vertical angle of 258° at 10 h. 48 m. The second is an occultation of B A C 4259, a 6th magnitude star, which will disappear at the dark limb at 9 h. 34 m. at an angle from the moon's vertex of 76°, to reappear at her bright limb at an angle of 263° from her vertex at 10 h. 56 m. The moon's age at noon to-day (the 11th) is 4·6 days; and on the 25th it will obviously be 18·26 days. Hence it will be seen that up to about the 20th she will be in the most favourable phase for the observer. During the next twenty-four hours she will travel from Gemini into Cancer, where she will remain during the 12th. She will leave Cancer and enter Leo on the 13th. She will be crossing Sextans during a good deal of the 14th, but will return into Leo before noon on the 15th, and remain in that constellation during the whole of the succeeding twenty-four hours. During the afternoon of the 16th she will travel into Virgo, where she will remain during the during the 17th, 18th, and part of the 19th, passing into Libra during the early morning of the 20th, and continuing there for the succeeding four-and-twenty hours. She moves into Scorpio about one a.m. on the 22nd. In the early afternoon of that day her path carries her into Ophiuchus, where we still find her up to seven a.m. on the 23rd. Then she passes into Sagittarius, where she remains during the 24th and 25th, and where we leave her.

Reviews.

SNAKE POISONS.*

AMONG the mysteries which science presents to us for investigation, there are few stranger or more alluring than those associated with snakes of the poisonous varieties. To begin with, the very existence of this singular provision—the power of poisoning—is a mystery of the strangest kind, at least to those who adopt the view of special creation for each class of animate existence. Why should certain creatures be provided with a power of killing other animals than those which are their natural prey? The Daboia and the Cobra, the Rattlesnake of America and the Blacksnake of Australia, do not require for their food such animals as dogs, and pigs, and monkeys, still less can they prey on man. Yet are they provided with the means of killing these animals, and that not in self-defence, for so far is the power of poisoning from protecting these animals that it serves as the most effective means of bringing upon them the destructive powers of man, the most potent of their enemies. To the believer in evolution, indeed, it is tolerably clear how this poisonous attribute was obtained. He can see, for instance, that without it the cobra could hardly secure its natural prey—creatures so lively, that, if merely caught and swallowed, their activity and tenacity of life would cause them to be most uncomfortable occupants of their capturer's stomach; whereas the paralysing venom speedily reduces them to a motionless state, "and places them," as Dr. Wall puts it, "at the mercy of the gastric arrangements of their enemy." The daboia, again, is in its movable poison fangs provided with "an elaborate hunting weapon," as truly such as the sportsman's gun. There is also, as Dr. Wall says, "a refinement about the physiological contrivance that can either kill at once by convulsions, or after an interval by paralysis, or at a still more remote period by blood-poisoning" (this relates specially to viperine poisoning), "to which the mechanical appliance"—the gun—"fails utterly to attain."

Dr. Wall's book gives a most interesting and detailed account of snake poisoning, indicating the phenomena which characterise the progress of colubrine and viperine poisoning. It will astonish many to learn that the deadly rattlesnake of America—a viper—is far less deadly than the colubrine snakes. The average period before death in four fatal cases of Crotalus poisoning in dogs was 2 hrs. 26 min.; and no fewer than five dogs recovered completely after being bitten: whereas with the Indian Cobra, "the average length of the period of fatal poisoning was 34·4 minutes," and with the Australian Hoplocephalus (a coluber) it was 1 hr. 24 min.; so that the rattlesnake is much less dangerous than either the Cobra or the Hoplocephalus.

As to remedial measures, it is rather disheartening to find that "the more frequent is the administration of antidotes, the shorter is the duration of life after it." In colubrine poisoning the patient should have nothing given him to swallow, after salivation and paralysis of the tongue and throat have shown themselves, as he is quite incapable of taking anything into the stomach, and the substance will very likely be forced into the windpipe. "I have even found, after death," says Dr. Wall, "remedies in the air-tubes of the lungs, which had been forced there by anxious friends, a circumstance which would have rendered recovery impossible."

* "Indian Snake Poisons, their Nature and Effects." By A. J. Wall, M.D. Lond., R.R.C.S., &c. (W. H. Allen & Co., London, 1883.)

Little encouragement is given to the hope entertained by many, that certain substances—such as potassium permanganate—which deprive snake-poison of its powers, may save life when injected after an animal has been poisoned in the natural way. If cobra poison is injected, and presently along the same cannula one of these disinfectants is injected, the action of the poison may be checked; but even that is not certain; and in ordinary snake-poisoning no effect whatever is produced. The reason is tolerably clear. "It is quite true," says Dr. Wall, "that potassium permanganate destroys the active agent of cobra-venom by oxidising it; but when introduced into the blood it, of course, commences oxidising indifferently all the organic matters with which it comes in contact, but it has no power of selecting one organic substance for oxidation rather than another. The oxidising power of the permanganate is, therefore, exerted on the constituents of the blood generally, instead of being reserved for the cobra-poison in it alone." That this is so, is shown by the fact that, if cobra-poison is dissolved in an organic solution, and the permanganate is added, the poison suffers little, if any, diminution of strength, for the oxidation has taken place, in that case, chiefly at the expense of the other organic matter.

The first point to be attended to in a case of snake-bite is to prevent at once, if possible, the absorption of the poison, by withdrawing the bitten part from the circulation. "There is only one way of doing this effectually," says our author; "at once let a thick india-rubber band—such as is used in Esmarch's bandage for bloodless operations—be firmly bound on the limb above the part bitten. No circulation, and therefore no absorption, can go on after this, and time can be taken to consider what further proceedings are necessary. An ordinary cord, or string, or bandage, is nearly useless compared with the india-rubber band. I have known fatal absorption take place when a string has been applied so tightly as actually to cut the flesh, and apparently strangulate the limb completely, causing acute suffering, evidently from the cord not accommodating itself accurately to the form of the member, and thus leaving a small channel for circulation. The india-rubber band is nearly painless, and, properly applied, is an absolute safeguard against further absorption."

After this, so soon as it has been ascertained that poison has really been injected, care must be taken "to remove by careful dissection out with a knife every part likely to contain the poison." Then, and then only, the india-rubber band may be removed, the part having first been freely washed with a solution of caustic potash or potassic permanganate.

Dr. Wall's book is full of highly interesting particulars; it is a most valuable contribution to science, and also to the literature of snake-poisoning.

KILLED BY STAYS.—It seems as though, after all, some *men* even are unwise enough to try waist-squeezing of mischievous severity. In the *Yorkshire Gazette* of the 5th inst. there is an account of an inquest on a young man, one F. W. Calvert, aged 23, only son of his mother, who died owing to the sudden failure of the heart's action. "It transpired that the deceased had been in the habit of wearing stays, and had them on on the day of his death." The *post-mortem* examination showed that the heart was diseased and enlarged, "its cavities being all empty."

LIGHTING THE SUEZ CANAL BY GAS.—After a trial of some months, says the *Engineer*, the Suez Canal Company has finally decided upon an extensive application of Pintsch's system of lighting harbours and rivers by means of gas-containing buoys and fixed lights, given by compressed oil gas. The Pintsch Patent Lighting Company has received instructions to erect a gasworks for the purpose at Port Said, and eight spherical buoys 9 ft. in diameter, and to burn for two months without re-filling, are at once to be sent out for lighting the canal approaches. Three fixed lights to burn two months are also to be erected, and three large holders for storing the gas are to be erected on suitable sites. The system will probably be used throughout the canal. The same system is also to be adopted at Port Philip, Victoria.

AT the International Fisheries Exhibition, which will be opened to-morrow, Messrs. Siemens Brothers are getting on with the preparations for lighting the southern arcade by means of 1,000 Swan lamps.

THE re-opening of the Parkes Museum of Hygiene by the Duke of Albany takes place on Saturday, May 26, in new premises, 74A, Margaret-street, W.

SINCE the 23rd instant, the current at the Edison Central Station, Holborn Viaduct, has been on the mains throughout the twenty-four hours, and will continue to be so in future.

ON Sunday week a cyclone passed over Beauregard and Wesson, Mississippi. In Wesson, 200 dwellings, mostly inhabited by factory operatives, were wrecked, 12 persons were killed, 75 were injured, and three children are missing. Beauregard was entirely destroyed; not one building remains standing; 23 persons were killed outright, 17 were mortally wounded, and 90 more seriously hurt. Tillman was also destroyed, and West Point much damaged, several persons being killed and injured. Medical assistance was sent from the neighbouring towns.

THE work of altering French lighthouses for the adoption of the electric light has been begun with those which guide into the principal ports, and those which give warning of the most dangerous rocks.

A TENDER, which will be a landmark in the history of electric lighting, has been made by the Telegraph Construction and Maintenance Company, to carry out an installation in Nottingham of 60,000 Swan lamps of 20-candle power. Five dynamos are proposed to be fitted, each weighing 45 tons, and each capable of maintaining 15,000 lamps. The total power employed or available will be 6,360 indicated horse-power. The cost of the installation will be £220,000, and the annual cost for maintaining the system is estimated at £42,608. Compared with gas at 2s. 6d. per 1,000 feet consumed at 60,000 burners, each giving a light of 12 to 14-candle power, a saving of £93,750 per annum will be effected, or sufficient to pay a dividend of $23\frac{3}{16}$ per cent. The stability of the Maintenance Company is sufficient to warrant us in believing that the above estimate is calculated on fair bases.

THE metrical system is made compulsory in Havanna from July next.

AT Cobham Hall, near Rochester, workmen, a few days ago, came upon a large earthenware jar, which was found to contain between 800 and 900 Roman coins in bronze, mostly of the fourth century, or about 100 years before the Romans left Britain, and are chiefly of the reigns of the Emperors Constantine, Constans, and Constantius. The spot where the coins were discovered was near the old Roman Watling-street, which ran through Cobham Wood towards London and the interior of the island.

ERRATUM.—In the article on the Crystal Palace Exhibition, page 264, first col., eleventh line from bottom, for "Bower-Griscom," read "Bower-Grimston."

"Let Knowledge grow from more to more."—ALFRED TENNYSON.

Letters to the Editor.

Only a small proportion of Letters received can possibly be inserted. Correspondents must not be offended, therefore, should their letters not appear.

All Editorial communications should be addressed to the EDITOR OF KNOWLEDGE; *all Business communications to the* PUBLISHERS, *at the Office, 74, Great Queen-street, W.C.* IF THIS IS NOT ATTENDED TO, DELAYS ARISE FOR WHICH THE EDITOR IS NOT RESPONSIBLE.

All Remittances, Cheques, and Post Office Orders should be made payable to MESSRS. WYMAN & SONS.

The Editor is not responsible for the opinions of correspondents.

NO COMMUNICATIONS ARE ANSWERED BY POST, EVEN THOUGH STAMPED AND DIRECTED ENVELOPE BE ENCLOSED.

SPELLING REFORM.

[813]—Although the problem of spelling reform does not seem to have found expression in the pages of your journal, I feel that the question cannot have escaped your notice. The subject has created attention, as may be seen from the fact of the existence of the Spelling Reform Association, with offices in John-street, Adelphi. Its list of patrons includes all the leading philologists, and many literary and scientific men of eminence. The names of Max Müller, Sayce, Ellis, Murray, Latham, Skeat, Morris, Sweet, in England; and March, Whitney, Lomsbury, in America, prove that the question has not been overlooked.

Max Müller says:—"Can this unsystematic system of spelling English be allowed to go on for ever? Is every English child, as compared with other children, to be mulcted in two or three years of his life, in order to learn it? Are the lower classes to go through school without learning to read and write their own language intelligently? And is the country to pay millions every year for this utter failure of national education?"

I refrain from entering now into any arguments for or against, but hope to receive, as a subscriber to your journal, a short expression of opinion from yourself or your readers.

A. MURRAY COBBOLD.

MY PARADOXES.

[BY A LAPUTIAN OF TEN.]

[814]—Will you afford me a little space to briefly, and, I hope, clearly, state my theories, which I call the Entelechian?* I promise not to attack (for I utterly disdain) any theories to the contrary, and I assert that mine are not alone new, but that they are also old, and that they will outlive all ordeals.

In the first place, I believe that I live, move, and have my being on a flat, circular Laputa, bounded edgewise by inaccessible ice, and radiated by very powerful magnetic currents converging at the centre of the circle, which centre has been hitherto called the North Pole. I believe that those mighty currents, so uniting, ascend straight from the Pole or Centre in an almighty pillar to the North Star; and by this magnificent column I believe that my Laputa is suspended and upheld.

Although I believe in a North Pole, I deny and denounce a South Pole.

I further believe that the Sun, like some gigantic warming-pan or celestial cook's "salamander," is perpetually being passed about over the flat surface of my Laputa (at a height of about 900 miles), in orbits alternately semicircular and spiral, for the first six months of the year approaching the dread Magnetic Pillar (by attraction), and for the other six months receding from it (by repulsion) like a frenzied comet. I also believe that several minor utensils, such as the Moon, Jupiter, Venus, Meteors, and the rest, go cricketing about above us in similar (but different) ways. Again, I am convinced that the whole twinkling host of heaven is ever twiddling round and round us, balanced on the pivot of the North Star. I must admit (for I am nothing if not candid), that we have not yet discovered the thickness of this our Laputa, though I hope every day to hear that one or other of the over-worked coal-mines has got through. I also believe that there is but one "Parallax," and that Gulliver was his prophet.

But I have reserved the most stupendous of my discoveries for the end. I do not desire to speak disrespectfully of our Great Magnetic Column of Suspension, but it is well known to be subject to considerable perturbations, especially since the date of these dangerous electric telegraphs and all that has followed in their wake. *I*, however, am devoid of apprehension, for I *know* that, in view of possible accidents, this Great Laputa, which I believe to be The World, is firmly placed upon the bowed shoulders of Atlas, who, with arms a-kimbo, proudly sets his feet firmly upon the red houdah of the Great White Elephant, who, in turn, serenely waggles his trunk and plants his four monstrous limbs upon the back of the Eternal and Infinite Turtle, whose fins are firmly rooted *in inferno*. So it's all right. And you are all wrong, and I do *not* believe in steamers or voyages. Sonowthen!—I remain, sir, yours paradoxically,

A LAPUTIAN.

The Academy, Lagado.

P.S., by Professor Naggdrib. Your March Part did not reach Lagado until yesterday. Our Postmaster's flapper-bearer having suddenly died, the service has been, and still is, disorganised. We trust you may receive this.

* Please turn to "Rabelais," Book 5, chapters 19 and 22. [Note by Professor Naggdrib, of Lagado.]

LETTERS RECEIVED AND BRIEF ANSWERS.

EXCELSIOR. Sorry for the mistake; but correction would now serve no useful purpose. Had *no* "earthly reason" for correcting it, except that when the proof reached me I could not tell what were the dates referred to by the words Saturday and Sunday, which appeared without either "last" or "following." It was necessary to insert one of these (at the time when letter appeared), and I put the one which seemed the more probable.—E. H. B. S. I said that London newspapers give very limited attention to lectures. You point out that twenty lines in relation to one of my lectures appeared in the *Daily Telegraph*, and about as much in *Lloyd's Weekly Paper*, besides, probably, other notices which you did not see, whereas scarcely any notices of lectures have appeared in KNOWLEDGE. But in the first place, KNOWLEDGE is not a newspaper, and has scarcely any space for lecture reports (you find as few in the *Academy*, *Athenæum*, *Nature*, and so forth); in the second place, the lectuers you mention are given for societies which need no notice, because they have been long established, are supported by hundreds of subscribers, &c. (the notices in the *Illustrated London News* are supplied by the lecturers themselves); thirdly and lastly, the sum of £120 was expended in advertising my course of lectures in the papers I referred to, besides some fifty course-tickets—sofa stalls—corresponding in value to £52. 10s. at the advertised price. Now, when theatrical and musical matters are advertised in the newspapers, and free admissions given to the press, it is expected that a reasonable amount of notice will be given in columns not devoted to paid advertisements. This is done; and my contention was that what is done for theatrical, musical, and artistic entertainments should, in common fairness and courtesy, be done for scientific lectures, given at greater risk of loss. When a similar claim can as justly be made on KNOWLEDGE, it will not be found that the claim is overlooked.—H. L. The lectures have never been committed to paper. —A. H. S. Shortly.—L. Y. I.—J. R. SUTTON.—T. A. (1.) Prof. Tyndall could not very well tell what neither he nor anyone knows, or explain what neither he nor anyone understands. (2.) There is no risk of collision with live suns; why should dead suns be feared? (3.) That the sun's surface we see is not that of a molten mass may be true enough; yet the sun's real globe may be a molten mass. So the real globes of Jupiter and Saturn may be (and I think are) molten masses. But I do not *know*. I doubt very much whether the earth and moon ever were as Dr. Ball suggested. But again I don't *know*. In these columns, at any rate, neither Mr. Always-Right nor Mr. Never-Wrong shall appear,—to pain the soul of Mr. Wilkie Collins.—K. M. Will certainly find space.—SAMUEL. Query column closed months since.—ETONIAN. It is very difficult to guess precisely what Carlyle believed in such matters. In his "Sartor Resartus" there is a passage implying that he would regard miracles as belonging simply to a higher order of natural events than the order with which we are familiar. I doubt if he, or any one whose opinion was or is worth aught, accepted the particular matter to which you refer as other than a myth—doubtless, a solar one; at any rate, it is common to all solar myths, without any exception whatever.—E. Y., LIEUT., F.R.A.S., WILLING, M. SMALL. Letters shall appear as soon as space available.—JUSTITIA OMNIBUS. Joke worn out.—BECCABUNGA. Perhaps you can explain (what I must admit beats me) *how* the light which

is now—you say—absorbed by the moon's atmosphere can become "a great acquisition to this world of ours."—A Little Girl. Yes; very likely a silly person like your Kezia (a sweet name) would fancy that, because a small waist is nice, a pinched waist must be nicer, just as those perfectly ridiculous people who draw the fashion books evidently think hands and feet should be smaller than ever nature made them. So Burne Jones, because the great painters show where muscles are, puts two-inch cables for some muscles in his pictures, and bell-pulls for others. As you get older you will find such follies cropping up everywhere.—W. S . . . . n. Your son was well known to me by reputation, though I never had the pleasure of meeting him. His lectures were widely and favourably remembered in Australia and New Zealand. If you would draw up a list of the instruments, I would insert it among letters or pars, hoping some might see it who would want instruments so valuable. —W. Lawton wishes to learn Professor Palmieri's process for silvering glass. — J. Thorburn, M.D., R.L.L., and many others. Know absolutely nothing personally about the system of mnemonics to which you refer. — Doubtful. Either Mr. Christie, Astronomer Royal, or Mr. J. Brett, landscape painter, could tell you, I fancy,—perhaps both.—A. J. S. Surely I could not be offended. Such letters are not of the kind referred to by me. But your information is incomplete, and I cannot but think you are mistaken. If by the "person referred to" you mean the person "mentioned," *his* conduct has not been characterised in words having the bearing you indicate; if, on the other hand, you mean simply the (unidentified) person referred to, should *he* come forward, it will be he, not I, who is concerned. I knew perfectly well what you mention about "truth," but neither in one event nor in the other is that point involved. I think I should be rather interested to see your opinion tested; and I believe you would find it would turn out to be altogether erroneous. But what you say I "shall, of course, think about" you, I, of course, do *not* think. I recognise the sincerest kindness in your advice; but frankly, if I yet the chance, I shall follow the line I have indicated—simply because I think that to be my duty. John Greenfield. Yes; three grumblers, counting Master John Greenfield. You ought not to be annoyed that your wild theories cannot appear here; schoolboys are not expected to understand such matters. In a few years you will known that Bourbon whisky is not Scotch. What do you say to waiting till then before you write again?

Our Chess Column.

By Mephisto.

LONDON INTERNATIONAL CHESS TOURNAMENT.

We publish a score table, from which our readers will be able to follow the course of events. Zukertort, who had won his first two games, further distinguished himself by winning all his games last week against his four opponents. His game with Mason, played on Monday, was very hard fought, and, in some of its passages, very brilliantly played. But his game with Blackburne, which we publish below, will take rank as one of the most brilliant productions of Chess skill. On Tuesday, the 8th inst., the principal event of the first round came on for decision. Zukertort had to play Steinitz. The latter followed up his defeat of the first week by playing the same opening against Tschigorin on April 30, with the result that he was again defeated. Since then, Steinitz has abandoned the Steinitz Gambit, and fortune has once more declared itself in his favour. He defeated Mason, Mackenzie, Mortimer, and Skipworth, and, on meeting the then favourite, Zukertort, his score stood 5 to Zukertort's 7. Zukertort got the best in the opening, and won an exchange; but, owing to a strange oversight, his game suddenly collapsed. The game ran as follows:— White, Zukertort; Black, Steinitz. 1. P to K4, P to K4. 2. Kt to KB3, Kt to QB. 3. Kt to B3, P to KKt3. 4. P to Q4, P takes P. 5. Kt takes P, B to Kt2. 6. B to K3, Kt to B3! 7. B to K2, Castles. 8. Castles, R to K sq. 9. Q to Q3, Q to K2. 10. Kt(Q4) to Kt5, P to Q3. 11. B to Kt5, Kt to K4. 12. Q to Q2, B to K3. 13. Q to B4, KR to QB sq. 14. Q to R4, P to B3. 15. P to B4, Kt(K4) to Q2. 16. Kt to Q4, P to KR3. 17. Kt takes B, Q takes Kt. 18. B takes P, B takes B. 19. Q takes B, Kt takes P. 20. B to Kt4, Q takes B. 21. Kt takes Kt, Q to B4. 22. R to K sq, R to K sq. 23. R to K3! R takes Kt. 24. R to R3! Q to B3. 25. Q to R7(ch), K to B sq. 26. Q to R8(ch), K to K2. 27. Q takes R, Q to Q5 (ch). 28. K to R sq, R takes P. 29. R to K sq(ch), R to K5. 30. R takes R(ch) (a miscalculation), Q takes R. 31. Q takes RP, P to Kt3, and White resigned, as he cannot prevent the mate by Q to K8.

SCORE UP TO TUESDAY NIGHT.

	Bird	Blackburne	English	Mackenzie	Mason	Mortimer	Noa	Rosenthal	Sellman	Skipworth	Steinitz	Tschigoryn	Winawer	Zukertort	Draws not counting	Total score
Bird	—		1	1	0	1		1		1		0	1		5	4
Blackburne		—	1	0			1		1	1				0	5	4
English	0	0	—				1		1		1	1	0		3	4
Mackenzie	0	1		—	0		1			1	0			0	2	3
Mason	1			1	—		½		1	1	0			0	3	4½
Mortimer	0					—	0	0	0	0	0		0	0	1	0
Noa		0	0	0	½	1	—			0		0		0	3	1½
Rosenthal						1		—	0			1	½		7	2½
Sellman		0	0		0	1		1	—			0	0		4	2
Skipworth		0		0	0	1	1			—	0			0	1	2
Steinitz			0	1	1	1				1	—	0	1	1		6
Tschigorin	1		0				1	0	1		1	—	1	0	1	5
Winawer	0		1			1		½	1		0	0	—		4	3½
Zukertort		1		1	1	1	1			1	0	1		—	1	7

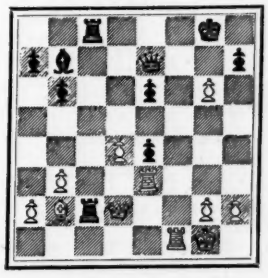
A Memorable Game Played in the First Round on May 5.

ENGLISH OPENING.

White. Zukertort.	Black. Blackburne.	White. Zukutort.	Black. Blackburne.
1. P to QB4	P to K3	14. Q takes Kt	P takes P
2. P to K3	Kt to KB3	15. B takes P	P to Q4
3. Kt to KB3	P to QKt3	16. B to Q3	KR to B sq
4. B to K2	B to Kt2	17. QR to K sq(*c*)	R to B2
5. Castles	P to Q4	18. P to K4	QR to QBsq (1 hour)
6. P to Q4	B to Q3(*a*)	19. P to K5 (1 hour)	Kt to K sq
7. Kt to B3	Castles	20. P to B4	P to Kt3
8. P to QKt3	QKt to Q2(*b*)	21. R to K3	P to B4(*d*)
9. B to Kt2	Q to K2	22. P takes Pen pas	Kt takes P (*e*)
10. Kt to QKt5	Kt to K5	23. P to B5	Kt to K5
11. Kt takes B	P takes Kt	24. B takes Kt	P takes B
12. Kt to Q2	QKt to B3	25. B takes Kt P	R to B7
13. P to B3	Kt take Kt		

Blackburne.

Black.



White.

Zukertort.

26. P takes P(ch)	K to R sq
27. P to Q5(ch)	P to K4
28. Q to Kt4 (*f*)	R(B sq) to B4
29. R to B8(ch)(*g*)	K takes P
30. Q takes P(ch)	K to Kt2
31. B takes P(ch)	K takes R
32. B to Kt7(ch)	K to Kt sq(*h*)
33. Q takes Q	Resigns

NOTES.

(*a*) B to K2 is preferable.

(*b*) We prefer to post the QKt on B3 in conjunction with the previous moves of B to K2 and P to QB4.

(*c*) Preparing for an advance in the centre, he has nothing to fear from the Rooks on QB file.

(*d*) Seriously compromising his game. He ought to have played Kt to Kt2.

(*e*) Again Q takes P would have been preferable.

(*f*) One of the finest combinations that have been made over the board, if Q takes Q White mates in 7 moves by B takes P(ch), K

takes P. R to R3(ch), K to Kt3. R to B6(ch), K to Kt4 or (*a*) R to Kt3(ch), K to R4. R to B5(ch), K to R3. B to B4(ch), K to R2. R to R4 mate (*a*) if K to Kt3. R to Kt3(ch), K to R2. R to B7(ch), K to R3. B to B4(ch), K to R4. R to R7 (mate).

(*g*) Mere praise would be like painting the lily. If Q takes R, then follows B takes P(ch) and Q takes P(ch) with a speedy mate.

(*h*) If Q takes B, Q to K8 (mate).

PLAYED IN THE FIRST ROUND OF THE INTERNATIONAL TOURNAMENT, MAY 3, 1883.—KING'S GAMBIT.

White. Tschigorin.	Black. Sellman.	White. Tschigorin.	Black. Sellman.
1. P to K4	P to K4	12. Q takes B	P takes P
2. P to KB4	P takes P	13. R takes P	Q to K2
3. Kt to KB3	P to KKt4	14. Q to B4	P to Q3
4. B to B4	B to Kt2	15. R to KB sq(*c*)	Kt to Q sq
5. P to Q4	P to Kt5(*a*)	16. R to R5	P to Kt4(*d*)
6. Kt to Kt sq	Q to R5(ch)	17. B to Kt3	Kt to K3
7. K to B sq	Kt to QB3	18. Q to K3	P to R3
8. P to B3	B to R3	19. B to Q5	R to Kt sq
9. Kt to QR3	P to QR3	20. Kt to B2	Kt to Kt4
10. P to KKt3(*b*)	P takes P	21. Kt to Kt4	Kt to B3
11. K to Kt2	B takes B	22. Q takes Kt(*e*)	

And White won.

Duration 3 hours 40 minutes.

NOTES.

(*a*) After 4. B to Kt2 the advance of the Pawns weakens Black's game.

(*b*) Bold and attacking.

(*c*) White gets a fine attacking position.

(*d*) Weak; Black ought to play Kt to K3 at once.

(*e*) The culminating point of the game, and a most admirable stroke, for if 22. P takes Q. 23. R takes R(ch), K to Q2. 24. B to B6(ch), K to K3. 25. P to Q5(ch), K to K4. 26. Kt to Q3 (ch), K takes P. 27. R to K sq(ch) winning the Queen and remaining with a Rook ahead.

PLAYED IN THE FIRST ROUND ON MAY 5.
KING'S BISHOP'S GAMBIT.

White. Mortimer.	Black. Bird.	White. Mortimer.	Black. Bird.
1. P to K4	P to K4	11. Q takes Q	Kt takes Q
2. P to KB4	P takes P	12. K to Kt2	B takes B
3. B to B4	Q to R5(ch)(*a*)	13. BP takes B	Kt to B7(*d*)
4. K to B sq	P to Q3	14. R to Kt sq	Kt to Q8(ch)(*e*)
5. Q to B3(*b*)	Kt to QB3	15. K to B sq	P takes P
6. P to KKt3	Q to B3	16. P takes P(*f*)	R takes R
7. Q takes P	Kt to Q5	17. B to Kt5	R takes Kt(ch)
8. B to Kt3	B to K3	18. K takes R	Kt to B6(ch)
9. P to Q3	P to KR4	Resigns.	
10. Kt to QB3(*c*)	P to R5		

Duration 40 minutes.

NOTES.

(*a*) P to Q4 is preferable.

(*b*) Leading to MacDonnell's attack.

(*c*) P to KR4 was requisite.

(*d*) White pays a heavy penalty for his mistake in allowing this move.

(*e*) A very fine combination.

(*f*) The position is highly remarkable; Black threatens P to Kt7 and P takes R Queen.

KIRKCALDY NATURALISTS' SOCIETY.—The first conversazione of this society was opened on Friday evening, April 27, by Professor Stuart Blackie, in a suitable address, in which the well-known Professor admonished his hearers to study the works of the Almighty in every development of Nature, not to fill their brains from musty old books when every little flower had a far nobler lesson to teach. Mr. James Shepherd, of Rosind Castle, Burntisland, vice-president of the society, then read a paper on the "Beginnings of Life." Commencing with the well-known aphorism of Harvey, the discoverer of the circulation of the blood—"Omne animal ex ovo"—Mr. Shepherd went on to tell his hearers that, "besides the eggs laid in this country, over 500,000,000 were annually imported, and that, although so many eggs are daily consumed, few take the trouble to even think of the real nature of this pretty, oval, white, dainty-looking thing, which is one of the most wonderful, most marvellous objects in creation, representing the beginning and the origin of every living individual in the animal world, there being a perfect sameness in the origin of everything that lives, and breathes, and grows, plants as well as animals, amongst which latter is man, both springing from a simple cell." After explaining the differences between the eggs of birds, fishes, and reptiles, Mr. Shepherd concluded thus:—"There is nothing more worthy the attention of naturalists than eggs, but at the same time there is nothing more difficult. The great delicacy of the phenomena which present themselves, and the great complexity of the conclusions to be drawn from them, and above all the veil which men have for so long seemed disposed to throw over the origin of the living animal had (until the microscope pierced the hidden depths), surrounded the subject with innumerable obstacles. But we may rest assured that whatever is, is a fit subject for man's researches, nothing should be declared a mystery or be kept hidden from human eyes, until human intellect has, after repeated efforts, been baffled in the attempt to solve it. It is time enough to warn us away from the inner sanctuary of the temple of science, or to cry, 'Thus far shalt thou go, but no further,' when our inquiries have ceased to be in the cause of truth." Other addresses with experiments were delivered by Mr. Allan Mathewson, of Dundee, on Flint Implements, and "Rubbings" of Ancient Sculptured Stones of Scotland, of which many specimens were exhibited; by M. J. J. Mann, of the National Electric Company, Glasgow, on the Production of the Electric Light; and by Mr. Ernest Shepherd, on Frictional and Voltaic Electricity. The rooms, which were opened on Saturday afternoon and evening, were visited by numbers of the artisan class, who seemed deeply interested with the scientific and mechanical exhibits. Mr. Sang, the energetic secretary, deserves great praise for the able manner in which he organised and carried out all the arrangements.

AT the second annual general meeting of the Maxim-Weston Electric Light Company, the Chairman, in his opening congratulatory (!) address, observed that, all things considered, he did not think they had done so very badly. Though they had lost £70,000 in the purchase of patents which they had not used, and had conducted the lighting of the City at a loss, they had managed to avoid getting into difficulties. For further patents they paid £52,000. Up to the date of October, 1882, they made sales amounting to £6,776, with a clear profit on that of £1,666. These were sales of their lamps, dynamos, and apparatus. They took a certain amount of contracts as low as they could. There was the Metropolitan Railway contract—on that they made a loss of £1,225. Then there was the Edinburgh Post-office, which resulted in a loss of £380. They thought it well at a certain sum to take a contract for lighting the Botanic Gardens. There they had a loss of £26, while at Reading they also made a loss of £26. On the City lighting they had made a loss of £4,405. Their great loss on the City lighting had been owing to their having had to lay their cables two or three times, and the difficulty of getting them properly to carry the electricity from the other side of the river. They had spent no less than £1,347 for the Crystal Palace Exhibition; at Warwick House, Regent-street, £170; at the Guildhall, £160; and at the Albert Hall, £50. These were exhibitions. At the Opera House, too, there was an installation before this Company came into existence, and there was an expenditure of £128. Altogether £1,868 had been spent on exhibitions, and that, added to the loss of £6,064, was a very considerable item. Having, however, got all the advantage they could by the exhibitions, they had declined to exhibit any more. Notwithstanding the bad appearance such figures must make on a balance-sheet, the directors think the prospects of real business warrant an increase in capital to the amount of £500,000.

NOTICES.

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